



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/546,622

08/22/2005

Tsugio Yokoo

4265-0063WOUS

4471

35301

7590

04/29/2009

MCCORMICK, PAULDING & HUBER LLP  
CITY PLACE II  
185 ASYLUM STREET  
HARTFORD, CT 06103

EXAMINER

DESAI, NAISHADH N

ART UNIT

PAPER NUMBER

2834

MAIL DATE

DELIVERY MODE

04/29/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/546,622	<b>Applicant(s)</b> YOKOO ET AL.	
	<b>Examiner</b> NAISHADH N. DESAI	<b>Art Unit</b> 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,9 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/22/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/26/2009 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1,4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gstöhl et al (US 5727307) in view of Matsuoka (JP 6-80377).

2. Regarding claim 1, Gstöhl et al teaches:

Art Unit: 2834

A shaft, used for an electric motor (Fig 14,1), to which a commutator to be fitted having a fit hole is fitted / fixed (Fig 14,25), comprising:

four strips of knurls (Fig 14,38),

wherein each strip of knurls is formed on an outer circumferential surface of the shaft as to extend along an axial direction (Fig 14,38),

wherein the strips of knurls are evenly spaced circumferentially about the shaft as measured from a vertex of the acute-angled triangles of each knurl (Fig 14,38).

Gstöhl et al do not teach that “each strip of knurls is formed into an acute-angled triangle,

wherein a pair of groove portions is formed between a pair of knurls at each position substantially adjacent to those knurls and another pair of groove portions is formed between another pair of knurls at each position substantially adjacent to those knurls,

wherein the vertexes protrude radially outward from the outer circumferential surface of the shaft and the groove portions sink radially inward from the outer circumferential surface of the shaft, and

wherein the outer circumferential surface of the shaft is placed between each pair of knurls and each pair of groove portions”.

Matsuoka (Figs 4-6 elements 23,24 and Fig 12,6) teaches a device wherein “each strip of knurls is formed into an acute-angled triangle (Fig 5,24) wherein a pair of

Art Unit: 2834

groove portions is formed between a pair of knurls at each position substantially adjacent to those knurls (Fig 5, next to element 24) and another pair of groove portions is formed between another pair of knurls at each position substantially adjacent to those knurls (Fig 5,23,24),

wherein the vertexes protrude radially outward from the outer circumferential surface of the shaft (Fig 5,23,24) and the groove portions sink radially inward from the outer circumferential surface of the shaft (Fig 5,next to element 24), and wherein the outer circumferential surface of the shaft is placed between each pair of knurls and each pair of groove portions (Fig 5, space between elements 23 and 24)".

It would have been obvious to a person having ordinary skills in the art at the time the invention was made to modify the knurls of Gstöhl et al to have a specific shape like an acute-angled triangle and arrange them in a specific manner as taught by Matsuoka.

The motivation to do so is that it would allow one to make a motor wherein the commutator is firmly seated on the armature shaft (Col 2 ll 11-12 of Gstöhl et al) and that it would allow one to improve the mounting strength of a part attached to the revolving shaft of a rotor and reduce manufacturing time (paragraphs 6 and 7 of Matsuoka).

Gstöhl et al clearly teaches the use of knurls except for the shape of the each strip of knurls is formed into an acute-angled triangle. It would have been an obvious matter of design choice to make each strip of knurls formed into an acute-angled triangle, since

Art Unit: 2834

such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955)

3. Regarding dependent claim 4:

The shaft according to claim 1, wherein axial-directional lengthwise dimensions of the knurls are set longer than that of the commutator to be fitted.

Regarding claim 4 above, Gstöhl et al discloses the claimed invention except for the shape or size of the knurls to set longer than that of commutator to be fitted. It would have been an obvious matter of design choice to shape or size of the knurls to set longer than that of commutator to be fitted, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). The motivation to do so would be that it would provide for a firm seating of the commutator on the armature shaft (Col 2 ll 11-12 of Gstöhl et al).

4. Regarding claim 9, Gstöhl et al (Fig 14) teaches that each strip of knurls is spaced from each other with the outer circumferential surface of the shaft.

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gstöhl et al (US 5727307) and Matsuoka (JP 6-80377) in view of Dunn (US 2708246).

5. Regarding claim 5, Dunn teaches a device wherein the commutator is fitted directly on the knurls of the shaft (Figs 1 and 2) and “wherein an inner diameter of the fit

Art Unit: 2834

hole is set larger than an outer diameter of the shaft and wherein the commutator to be fitted is fitted/fixed to the knurls". Dunn also teaches varying the depth of the knurls by varying the angle of the peaks and the use of knurls shaped in the form of vertexes (Col 2 ll 7-9, Figs 1 and 2).

Gstöhl et al and Matsuoka has been discussed above regarding claim 1, but fail to teach that "the commutator is fitted directly on the knurls of the shaft and wherein an inner diameter of the fit hole is set larger than an outer diameter of the shaft and wherein the commutator to be fitted is fitted/fixed to the knurls". In the same field of endeavor, Dunn teaches a device wherein the commutator is fitted directly on the knurls of the shaft (Figs 1 and 2) and "wherein an inner diameter of the fit hole is set larger than an outer diameter of the shaft and wherein the commutator to be fitted is fitted/fixed to the knurls". Dunn also teaches varying the depth of the knurls by varying the angle of the peaks and the use of knurls shaped in the form of vertexes (Col 2 ll 7-9, Figs 1 and 2). It would have been obvious to one of ordinary skill in the art to modify the device of Gstöhl et al and Matsuoka with the teachings of Dunn to make a motor wherein the commutator is fitted directly on the shaft via knurls. The motivation to do so would be that it would help secure the shaft in relation to the chosen element (Col 1 ll 15-16 of Dunn) and it would provide for a firm seating of the commutator on the armature shaft (Col 2 ll 11-12 of Gstöhl et al).

Art Unit: 2834

6. Regarding claim 10, Dunn (Fig 2 and Col 2 ll 45-47) teaches that the vertexes and an inner surface of the fit hole elastically deform upon contact.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1,4,5 and 9-10 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NAISHADH N. DESAI whose telephone number is (571)270-3038. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen Leung can be reached on (571) 272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/  
Supervisory Patent Examiner, Art Unit 2834

Naishadh N Desai  
Patent Examiner